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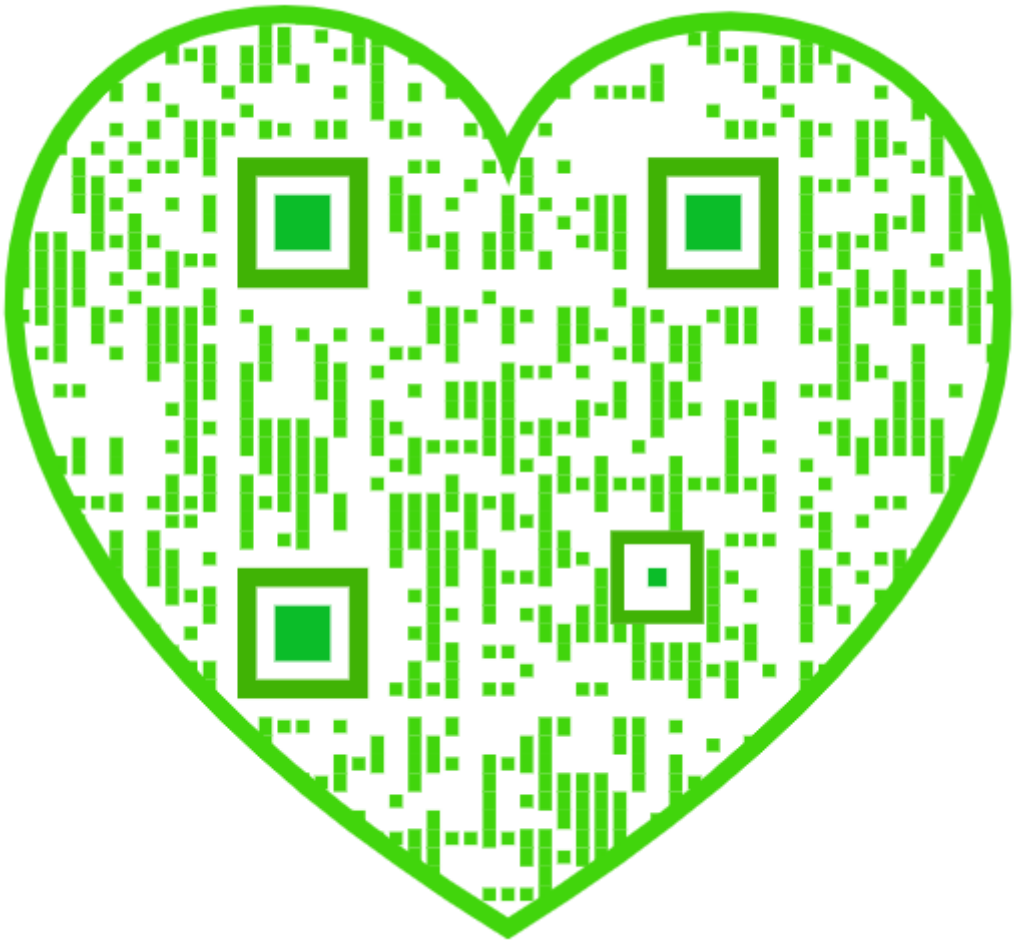

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PAPER TOYS

AND

How To Make Them

Second Edition

BY

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Illustrated

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PAPER TOYS

And How to Make Them.

INTRODUCTION.

The ability to retain a clear mental impression of any known object or to create new forms is of inestimable value. Most children have a natural and healthy tendency to receive and hold new impressions, but inefficient training generally neglects this faculty. An all-round education demands ample opportunity in school and house for creating plastic forms. The mere accumulation of abstract facts is an education decidedly insufficient.

Recognizing the important fact that children naturally like to make things, "plastic expression" is being advocated by many teachers and school authorities. But fortunately not everywhere have such occupations been introduced solely for "learning" purposes in the old sense of the word. There is a growing faith in the theory that children should not only be usefully but also happily employed. In fact, the educational value of an occupation depends largely on the joy-stimulating propensities it contains. The most capable teacher can create scarcely more than an artificial interest for certain subjects taught in the schools to-day. The joy-element can, however, on the other hand, be suppressed even in the most fascinating occupation if too great an emphasis is laid on its so-called "educational value;" this is so, for instance, when children are allowed to work only according to set rules.

We certainly should allow children to make use of and profit by the accumulated knowledge of past generations, but,

nevertheless, ability to do resulting from personal experiments is at least as important as the knowledge acquired while working according to dogmatic directions.

Children must be allowed to feel that for themselves, just as for adults, there exist certain free occupations, by means of which they can express their own individual inclinations.

Education is making such headway, that to-day even some of the most rigid advocates of a "blue-spectacled" pedagogy are beginning to concede that children wish not only to learn but to **live** while learning. With many children life really commences after school is out. However, since it has been proven of late years that children learn best while truly living and that manual training is a most fascinating as well as a most important part of education, many excellent men and women are striving to so readjust school plans that work in sand, clay, wood and paper are being introduced.

The selection of a life's work best adapted to personal inclinations depends very much upon the development of the ability to choose. Our generation demands that children be granted more freedom in the choice of those subjects with which they are daily employed. The children of the future will live before they appear, diploma in hand, on the threshold of life. All their doings are no longer to be looked upon as merely a preparation for adult life, but they shall come to know that every moment of happy childhood is a precious part of their wonderful existence. Just as adults gain a great part of their knowledge through practical life, so children should be permitted to enlarge their views through personal experiments while following occupations adapted to their natural bent.

As the term education grows to be applied to a larger range of subjects, manual training will also gradually be assigned that place in school and house which it deserves.

Manual training includes paper construction, which has many excellent advantages besides being remarkably cheap. The origin, development and possibilities of those paper forms with which I have particularly concerned myself are to be described in this pamphlet.

I. ORIGIN OF THE NEW PAPER FORMS.

When we were children, my sister and I built castles, mills, houses and barns out of the printed "form papers" of those times. The colors in which those designs were printed, as well as the paper, were both very poor, but we were glad to have something of that kind to do, and the working with them undoubtedly led us to invent the many little models of furniture and other objects with which we amused ourselves on rainy days.

Later, when we had a school, we thought of our early experiments and induced the children in our charge to work out similar designs. During the summer of 1902 I introduced into the New York vacation schools certain paper forms, which may be considered forerunners of the present series.

Thereafter a number of my inventions appeared in the New York Herald and other papers as "cut-outs." But these had to be pasted on cardboard, which was a great disadvantage.

Later, I went to Europe and there concerned myself for some time with the idea of manufacturing stamped-out paper forms, which the children would merely have to bend into shape and paste in certain few places. But, after a consultation with the eminent educator, Dr. George Kerschensteiner, of Munich, I decided to merely print the forms and have the children do the cutting-out. They have in this way a greater right to claim the finished product as a result of their own efforts.

It will be seen by this short sketch of the origin of these forms that they have gradually been evolved out of practical life—that they are not purely theoretical experiments.

II. QUALITIES AND ADVANTAGES OF THE NEW PAPER FORMS.

1. To anyone who sees for the first time a group of these paper toys it seems almost incredible that each object is constructed out of a single flat piece of paper. Only after a thorough examination is the beholder convinced that it really is true. Combining all sections into one piece simplifies the difficulties of construction very much, particularly for beginners.

2. If a sheet of paper is placed before the lamp as a shade, it curls up and falls over. If, however, this same sheet

is creased and set up like a half-open book it will keep its place and the problem is solved. By making frequent use of this "angle-strength" these paper forms are throughout peculiarly reinforced and able to resist outer attacks.

We find this angle-strength utilized in the construction of steel-beams, in rails and perhaps also in the fluted classical pillars, as well as in all material that is corrugated.

Should any of these objects drop from the table to the floor or even from a greater height they will not be seriously damaged, as the elasticity and lightness of the paper and the many well-jointed angles provide the necessary safeguard.

After having constructed them, children can play with these toys for a considerable time, and if any piece should accidentally be destroyed, it can be replaced by a new one, the replenishment furnishing pleasure more than sufficient to counteract the disappointment of loss. As an additional means of strengthening these objects double strips are used, which in many objects produce a more natural effect, as in the roof on the dog house and on the table-top, where the overlapping of the edges is secured. These double strips also prevent warping of the objects. All pasting strips answer the same purpose and are therefore made reasonably wide.

3. The elasticity and flexibility of the material are qualities to be taken advantage of in paper construction. They give the canoe its fine shape and can be found in the Gothic chair, the sled and other objects.

4. In selecting a model for an object or toy, care should be taken to adopt that which is mechanically and artistically correct; and it is upon this principle that the forms prepared by me have been selected. To illustrate what is meant by this, take, for instance, a chair; the back of a chair is constructed so as to provide comfort and in the seat should be found strength; the rounds connecting the legs are placed so as to give the completed object symmetry. In a well-constructed chair the rounds on the front do not join the legs at the same level with the rounds on the side; if they did the double joint would weaken the legs, and so in my chair-form I have placed the rounds as they would be in a well-constructed chair. In the cutting and making of the toys this principle is forcefully presented and there is an opportunity to instruct the child in the reasons therefor. The fact that one part of an object is constructed in one way while another part is constructed in another, notwithstanding the fact that the functions of both parts are practically the same, will call

attention to the fact that there is a difference and will necessarily suggest an inquiry as to why this difference should exist. In the explanation of this reason it should be borne in mind that there may be both an artistic and mechanical reason.

5. As nearly as possible the various parts of these forms are relatively of the same size as in the real objects. Exceptions are only made in those instances where the limitations of the material interfere.

All the forms are designed proportionately to each other, so that a little doll, if adapted in size to these objects, can write her letter with perfect ease and comfort while sitting on one of the common chairs at the desk; and a five-year-old "child-doll" can easily descend from the small swing without being hurt.

6. Many pieces of furniture and other objects about us carry unnecessary ballast, because they are unpractically constructed, and this is very often the reason they appear clumsy, unfinished and unsightly. I do not wish to imply that all things should be light and delicate; there are many instances where heavy objects are most appropriate.

To furnish a rocky mountain tavern requires different consideration than the decorating of a lady's parlor. No certain style shall here be preferred and pronounced to be the only acceptable one, but these toys are to emphasize the eminent value of simplicity and adequacy in construction. There must be a valid reason for the existence, size and color of each part in an object. All superfluity, all that is non-essential should be eliminated if an object is to be most practically constructed. For what reason do chair-legs converge (grow thinner) at the end? At least three reasons may be given: First, because a superfluous amount of wood is of no constructive value; second, because a chair is thereby made considerably lighter; third, because in consequence the chair has a better appearance.

The educated eye suffers discomfort in beholding superfluity just as nature abhors a vacuum. In nature there is nothing that is unpractical or purposeless. Carefully observe a plant and be amazed at the "thoughtfully planned" usefulness of each individual part. Therefore, he who wishes to follow the example of nature must grow to be a master in eliminating the non-essential. He must be able to keep out of his work all that threatens to disturb the harmony of the whole.

7. This introduces us to the art qualities of paper forms. The wide-spread opinion that an object is most beautiful when overladen with complicated ornaments must be denounced by the true artist. In the opinion of the artist only that has a right to exist which can "peacefully" adjust itself to the whole. In constructing an art product it is just as difficult to eliminate the non-essential as it is to apply those parts which are to build up the harmonious unit. While designing an object new ideas constantly spring up, all of which demand a strict control and proper selection. In planning these paper forms it is advisable to carefully select and apply only the artistically essential, so that each object may turn out to be a beautiful simple product of industrial art, neither crude on the one hand nor ostentatious on the other. Each decorative form which cannot reasonably be evolved out of the construction should be simply left off.

8. In selecting the paper for these toys the quality and color offered more difficulties than one may imagine. A very beautiful dark-blue color had to be rejected because the oculist ascertained that the print on this paper could not be clearly distinguished and would consequently be injurious to the eyes of many children. A color too light had the disadvantage of being easily soiled by finger marks. The paper finally chosen is neither too bright nor too dull and its thickness is adapted to the strength of the average child. The designs, models and explanations are printed as clearly as possible.

9. The correct designs, simple explanations and wide pasting-strips assist the children very much in their efforts at neat and exact execution. In printing only one or two designs on a sheet the rolling while carrying it is avoided.

III. The VALUE OF PAPER CONSTRUCTION FOR THE CHILD.

Besides the great pleasure of freely creating things—the life keenly lived—paper construction brings certain educational opportunities to the child:

1. The child may learn to mentally and actually plan out an object in sections on a piece of paper, then so group them that all join in one piece, and finally, by cutting, bending and pasting, create a form.

2. The child can learn to observe that every object is so built that it possesses a certain amount of resistance or latent strength. Not only are the various parts of an object so well joined that the whole is firmly united, but those places which are most exposed to wear and tear are particularly strengthened. Iron corners are nailed on to trunks for this reason. But since the usual methods of strengthening objects cannot always be employed in paper construction, owing to the limitations of the material, substitutes have to be invented. The child can therefore learn to discover new methods for strengthening objects and apply them in creating new paper forms.

3. If once the elastic flexibility of the paper is clearly understood the child will make use of it in many forms.

4. Whatever the child may construct, in every piece the practical and essential will be emphasized anew. Objects are made up of certain necessary parts and these parts must fit well together. If it is not so, a feeling of dissatisfaction will urge the child to make further experiments until the mistake is overcome.

5. A taste for proportions can be cultivated in the child by the frequent practice of measuring and comparing with and without ruler, which he is obliged to resort to.

6. Of very great importance is the early training in the elimination of all that is unnecessary and unpractical. When a child has made an object he should be able to state valid reasons for introducing the various parts of which it consists. In working out these paper forms opportunity should be given to observe that those objects which are most simply constructed—devoid of non-essentials—are also the most serviceable and best appearing ones.

7. These paper forms exercise a silent art influence, and encourage children to so construct their own inventions that they do not appear inartistic or misshapen.

8. In manual training one can in many cases give children the opportunity to select their own material, for instance, allowing them to choose the color and quality of paper for new designs. How shall taste and good judgment ever be cultivated if books, clothes, playthings, etc., are all selected by the parents without consulting the child as to his personal likes and dislikes. The development of good taste and good judgment cannot be commenced too early.

9. Children can practice economy while planning new forms. They may learn to so place their own designs on paper that there is little waste, and then to make of this waste other small objects.

10. In most children there dwells a desire to keep their books and papers neat and clean, but much greater is this ambition when it comes to producing neat manual work.

Paper construction stimulates a habitual desire for exact, neat and accurate execution.

The above-named educational possibilities of construction are perhaps the most important, but they do not exhaust the subject.

IV. DIRECTIONS FOR CONSTRUCTION.

General Remarks.

He, who wishes to construct an object, must have at the start a more or less perfect conception of whatever he intends to make. Perhaps it is best, if he can clearly see in his mind each part separately as well as the relation of each part to the whole. Yet, this clear foresight is to the beginner almost impossible. In working out these paper forms, for instance, the child learns first after a certain amount of practice how the parts of an object are combined.

The flat diagram is to the uninitiated a puzzle. He cannot at once explain all before the forms are cut out and bent into shape. He may even need a certain amount of assistance. This does not mean, however, that each step be explained. If the work is made too easy for the child, it will have no more attraction for him. He does not want the answer immediately after you place the puzzle in his hands. In order to prevent children from making mistakes, adults all too often deprive them of their best opportunities for growth, by taking upon themselves the performance of the task.

The school should not be a factory for producing perfect objects, but rather a place for the normal development of self-dependent individuals. Practicing the ability to solve problems stimulates the desire to overcome difficulties without help.

The child that mechanically works out these printed paper forms according to accurate directions, dictated step by step will never derive the profit from them that the child does,

who, unassisted, gradually learn to compare the models with the drawing and before cutting out does such independent thinking that much or all is clear to him.

But, on the other hand, one should not insist too strictly that children explain all from the printed sheet, as too much "schooling" will drive away the fun, the main purpose of these toys. It is much better if, before cutting out each new piece, the child is encouraged to discover, out of his own free will, more and more of that which is to be done.

Should a child, however, occasionally wish to go ahead and make a thing rapidly with little forethought, even such a procedure is not so bad as we sometimes imagine. The rich experience derived from the making of mistakes is sometimes of very great importance in the development of a character. Some children will thereby be most easily led to see that it is a considerable advantage to be able to tell, by merely looking at the plan, how, through cutting, bending and pasting, the object gradually assumes its proper shape.

When children are absolutely in need of help in paper construction, such questions may be put to them that the answers will be of service in approaching a solution. But if children can get into the habit of asking themselves these questions, such a course is to be preferred. One may mention three ways of working out these paper-forms.

(a) By very small children the parents do the thinking and perhaps also the working out.

(b) Children who have not arrrived at a state of perfect independence are assisted by careful questions being put to them.

(c) Children who are altogether independent reflect and think so long until they have personally solved the problem.

It is advisable to give a child at the most two sheets to work out in one day.

1. Cutting.

The cutting is done either with a pair of scissors or a knife. It is deplorable that some parents have a prejudice against these instruments. Partly, but not wholly, is this prejudice justified. Instead of developing in children a fear of these instruments it would be much better to invest a

little time and trouble in teaching them how, with a certain amount of care and discretion, accidents can be avoided. Fear weakens, carefulness strengthens the character.

In using dull-pointed scissors danger is altogether excluded and one may purchase also practically harmless knives, which consist of short blades in long wooden handles. It is well if children do not sit too close together while making paper toys.

Cut through all lines printed in solid black. Sometimes the little word "all" is overlooked and the child has commenced to bend the paper when some solid lines are still untouched. Small short lines are most frequently overlooked. It is well to cut close to the line and so that the line is still left on the object, not on the waste.

At first, the inner lines are cut, as the outer details of the object can be easily damaged while working on the inner sections. It is therefore best to commence with the latter. Inner sections that have solid lines on all sides are waste. If, however, an inner section is attached to the rest of the object by a dotted line it must not be injured.

The mistake of cutting into an object without intention gradually becomes less frequent as by practice the pupil learns to control the hand. Damaged places may be repaired by a small plaster on the inner side where it does not meet the sight.

Some places on certain sheets cannot be cut out with the scissors. This is the case particularly where the inner sections are too narrow to admit the scissors. (In the book case each section of the front is used.) Such places must be cut out with a knife. A knife can be used for all cutting out, if preferred. After some practice one can do very accurate work with knife and ruler. If, however, the pupil learns to cut without the assistance of the ruler he will have the advantage of a still better training for hand and eye. The knife must, of course, be very sharp, else the paper will not be thoroughly cut and the edges will look ragged. In cutting with the knife it is well to lay a piece of heavy cardboard under the sheet.

2. Tracing.

Tracing is perhaps done best with a dull fruit knife, but there exist also small tracing blades, which can be inserted in the penholder. Care must be taken not to trace too deeply, as a light impression is quite sufficient. The tracing must

be directly over the line, else one surface will turn out too large and the other too small, making a misfit all around. Since the wide-dotted lines must be traced on the back of the paper it is necessary to transfer them. This is done by making a pin hole at each end of the desired line and connecting these two points on the other side with a ruled line, which then can be traced.

3. Bending.

Always bend the traced side out. If the bending is done towards the wrong side (tracing inside) the paper is likely to break. Bending is facilitated by laying the paper over a sharp edge like the rim of an open tin box. The whole shape must be bent before pasting begins.

4. Pasting.

Only the very best paste or glue is to be used; as nothing is more discouraging than paste that does not stick. Unfortunately most of the cheap mucilage put up in bottles is of inferior quality, which tests the patience of the children to the utmost.

Paste is put on with a brush, a flat stick or a piece of waste paper. Care should be taken that not too much paste is put on as it will dry slowly and soil the work when it is squeezed out at the sides. It is best to scrape off superfluous paste before pressing the surfaces together. A surface ought to stick after counting forty and must be held until it does stick. Small paper clips may be used for this purpose. All places where two surfaces meet must be pasted in order to make the form as firm as possible.

5. Inventing.

A chief aim of all these paper toys is to stimulate the inventive genius in children. They should not only work out the printed forms, but make also original designs. Even a small deviation from the printed plans is of value, because it is while designing that the child first learns to realize more fully what is necessary to construct an object. In the printed

plan the most difficult part of the process is already accomplished.

If the young inventor will be content to design a larger boat than the one on sheet No. 3 for a start, he will find that it is not so easy as it seems. In a complicated object like the chair, however, the difficulties are still greater. If the inventor considers the chair as made up of those separate parts out of which it is constructed in the factory it will not help him in paper construction. Here he must think of objects as being constructed out of surfaces.

As an architect designs façade, side elevations and back view of a house, similarly must the paper-constructor proceed in his work. One way of going at it would be to sketch the back view of the chair on a piece of paper of appropriate size; pin to the right and left of this piece sketches of the two side views, and onto these the front; finally attach a view from the top—the seat—and the primitive form is crudely constructed. Thereafter, a few pins can be taken out and the form, all surfaces still hanging together, be spread onto a table. In this way can be ascertained how the various parts should be arranged on the desired plan. Then the waste paper between the rounds, etc., can be cut out and the model may be pinned together several times more while making other improvements.

This crude model shows how, in the main, the construction is possible. Now a more accurate drawing according to scale is made with the addition of the necessary pasting strips. This accurate drawing is cut out and a small chair made of it, which this time has the advantage of being made out of one piece. On this little chair one usually finds the need of several more improvements, and after these have been made, a new and perfect design is drawn on good paper, which is afterwards transferred onto stiff paper. The perfect little chair made therefrom is final proof that the design is absolutely correct.

Conclusion.

A careful observer of children cannot fail to note how differently they are gifted for the various occupations with which they can be employed. That which is most fascinating in children is perhaps their naive individuality, the surprises they daily bring to us through their manifold ways of expression.

That this vigorous originality gradually decreases from year to year after the school period has commenced, may be perhaps partly attributed to the fact that subjects like reading, writing and arithmetic do not on the whole interest children so deeply as the former free occupations.

If the ability of a child is measured in school by means of marks and numbers, this does not necessarily indicate that he is either smart or dull in every respect. Often it happens, however, that a child which does not make good progress in school gets the reputation of being an all-around fool, and this is told him so often that at last he believes it himself and finally degenerates into one of the lowest type of men.

This is unjust, for such a child has perhaps a latent gift for work which does not happen to be on the school-plan. A school curriculum can, of course, not be all inclusive, but it is absolutely certain that through manual training a larger number of children find opportunity to develop their innermost tendencies than through reading, writing and arithmetic. It has also been proven that progress in the last-named studies has been greatly enhanced through the revival of the real life that children have enjoyed wherever manual work has been introduced.

Much has of late years been written and said about manual training, and intelligent schoolmen are everywhere busily engaged working out new studies that will be of vast importance to the coming generation.

Paper construction as it is to-day is not yet at the top of perfection, but what we have is of considerable value and certainly a joy-bringing occupation, overflowing with wonderful possibilities.